

**SYSTEM AND METHOD FOR
NON-CASUAL CHANNEL EQUALIZATION
IN AN ASYMMETRICAL NOISE ENVIRONMENT**

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ABSTRACT OF THE INVENTION

A system and method are provided for non-casual channel equalization in a communications system. The method comprises: receiving a non-return to zero (NRZ) data stream input; establishing thresholds to distinguish a first bit estimate; comparing the first bit estimate in the NRZ data stream to a second bit value received prior to the first bit, and a third bit received subsequent to the first bit; in response to the comparisons, determining the value of the first bit; tracking the NRZ data stream inputs in response to sequential bit value combinations; maintaining long-term averages of the tracked NRZ data stream inputs; adjusting the thresholds in response to the long-term averages; and, offsetting the threshold adjustments to account for the asymmetric noise distribution. Two methods are used to offset the threshold adjustments to account for the asymmetric noise distribution. In the first, the method comprises: following the determination of the first bit values, forward error correction (FEC) decoding the first bit values (this method assumes that the NRZ data stream is FEC encoded); tracking the number of corrections in the first bit when the first bit is determined to be a "1" value; applying an offset to the third threshold (V_{opt}) to minimize the number of errors when the first bit is determined to be a "1" value; and, applying a proportional offset to the first (V_1) and second (V_0) thresholds. In the second method FEC decoding is not required. The method comprises: tracking the ratio of first bit "1" values

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to first bit "0" values; applying an offset to the third threshold (Vopt) to make the tracked ratio approximately equal to one; and, applying the same offset to the first (V1) and second (V0) thresholds.

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